

Overview of the Europa Lander Flight System Concept

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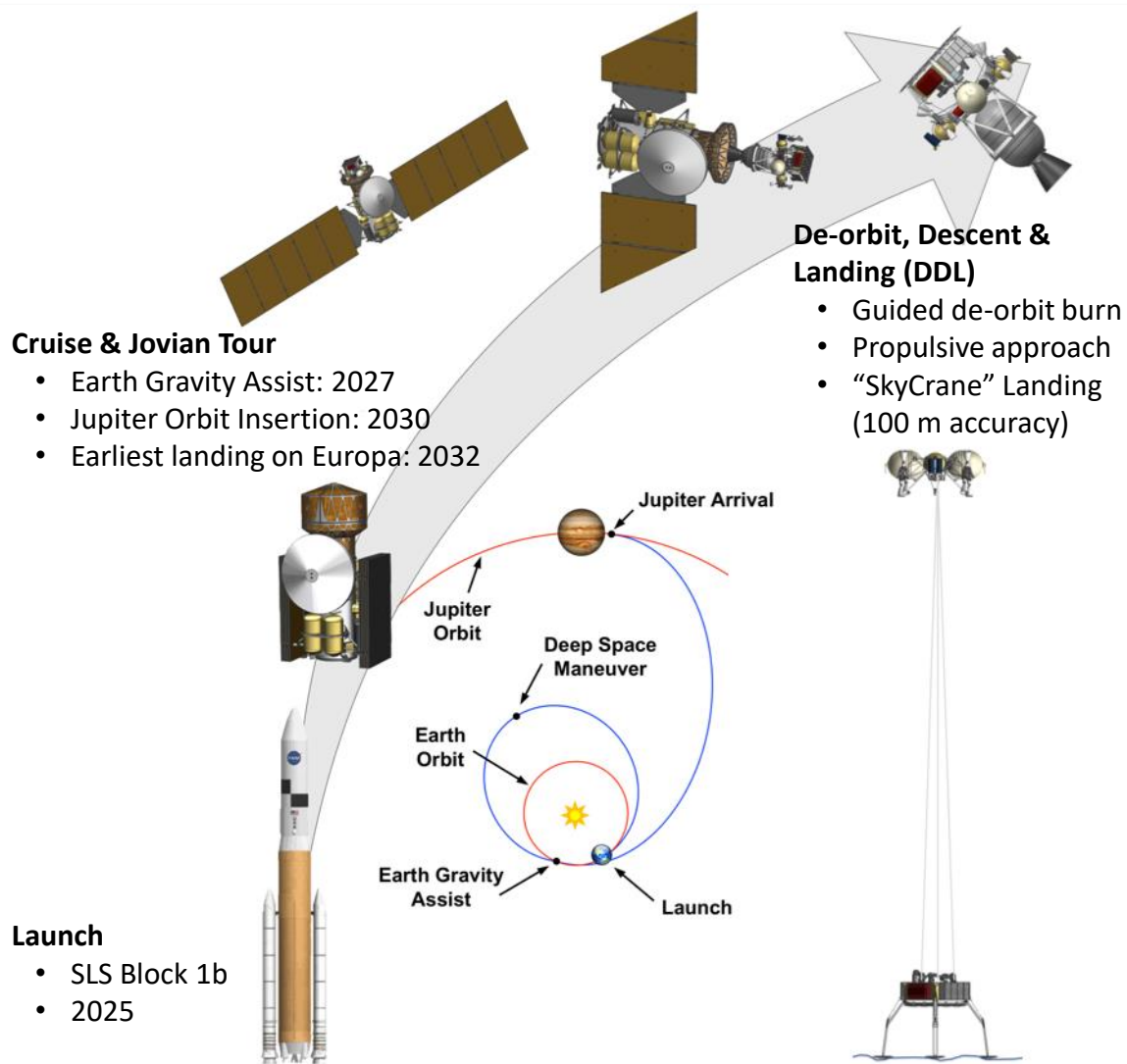
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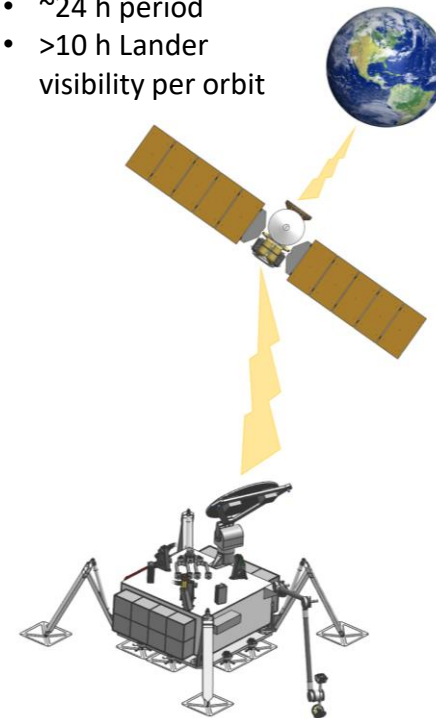


Lander Mission Concept - Baseline



Carrier Relay Orbit

- ~24 h period
- >10 h Lander visibility per orbit

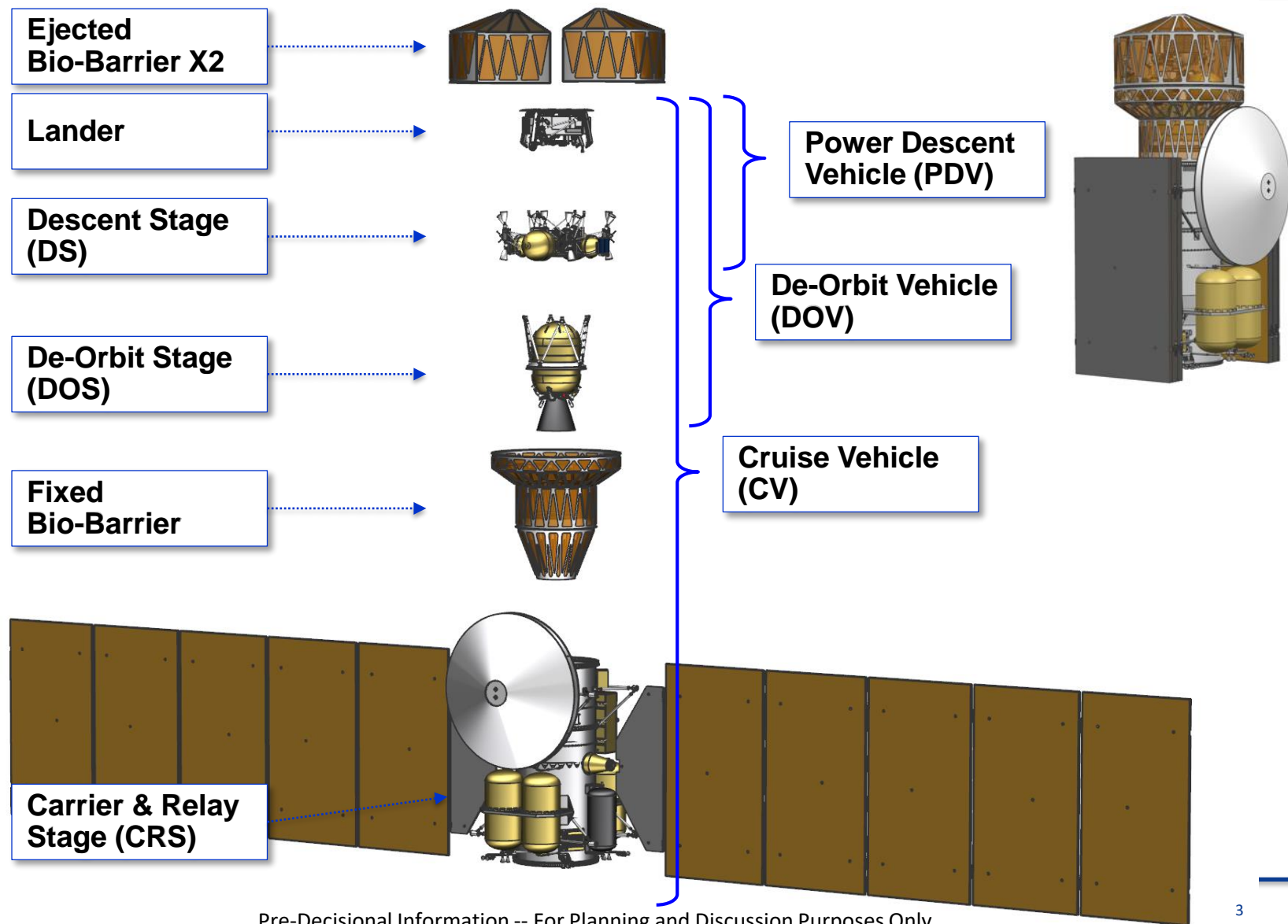


Surface Mission

- 20+ days surface mission
- 5 samples
- Relay communications through Carrier or Europa Clipper (backup)
- 3-4 Gbit data return
- ~45 kWh primary battery



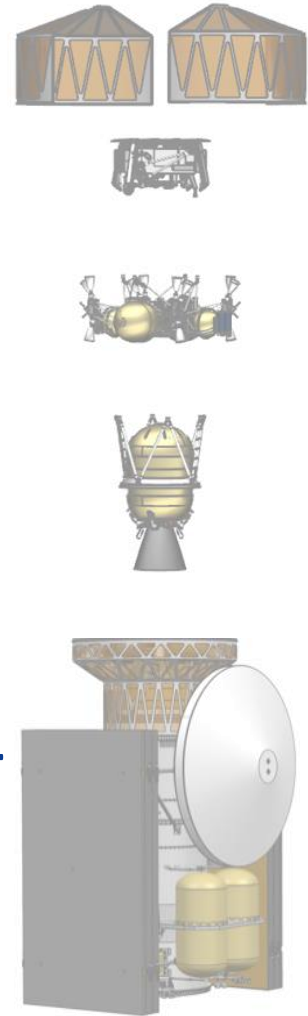
Flight System Concept Composition & Nomenclature





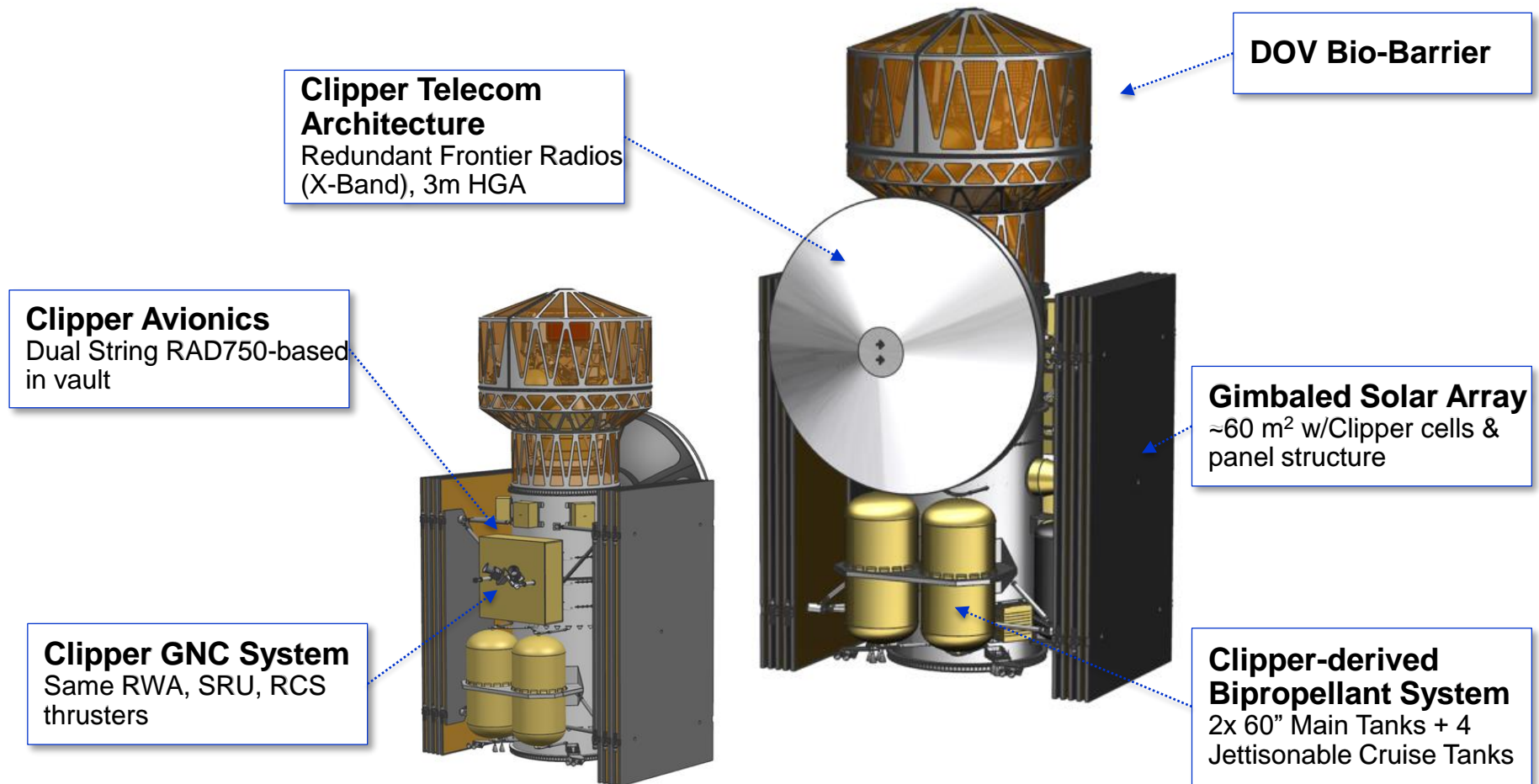
Notable Concept Drivers & Features

- **Synergies with the planned Europa Clipper mission**
 - Leverage subsystem heritage whenever feasible
 - Landing site recon and back-up telecom asset
- **Flagship / Class A style mission**
 - Drives redundancy / fault-protection architecture
- **No radioisotope power or heater units**
 - Lander batteries complement radiation shielding
 - Battery chemistry can generate usable heat
- **“Smart” Decent Stage for safe & accurate landing**
 - SkyCrane minimizes landing site alteration
 - Uses terrain-relative navigation and hazard avoidance
- **Planetary Protection approach for mostly conventional SI&T**
 - DHMR bulk material / VHP surfaces before launch
 - Self-sterilization at EOM for select FS elements
- **Launch on SLS Block 1b in 2025 (Δ VEGA Trajectory)**



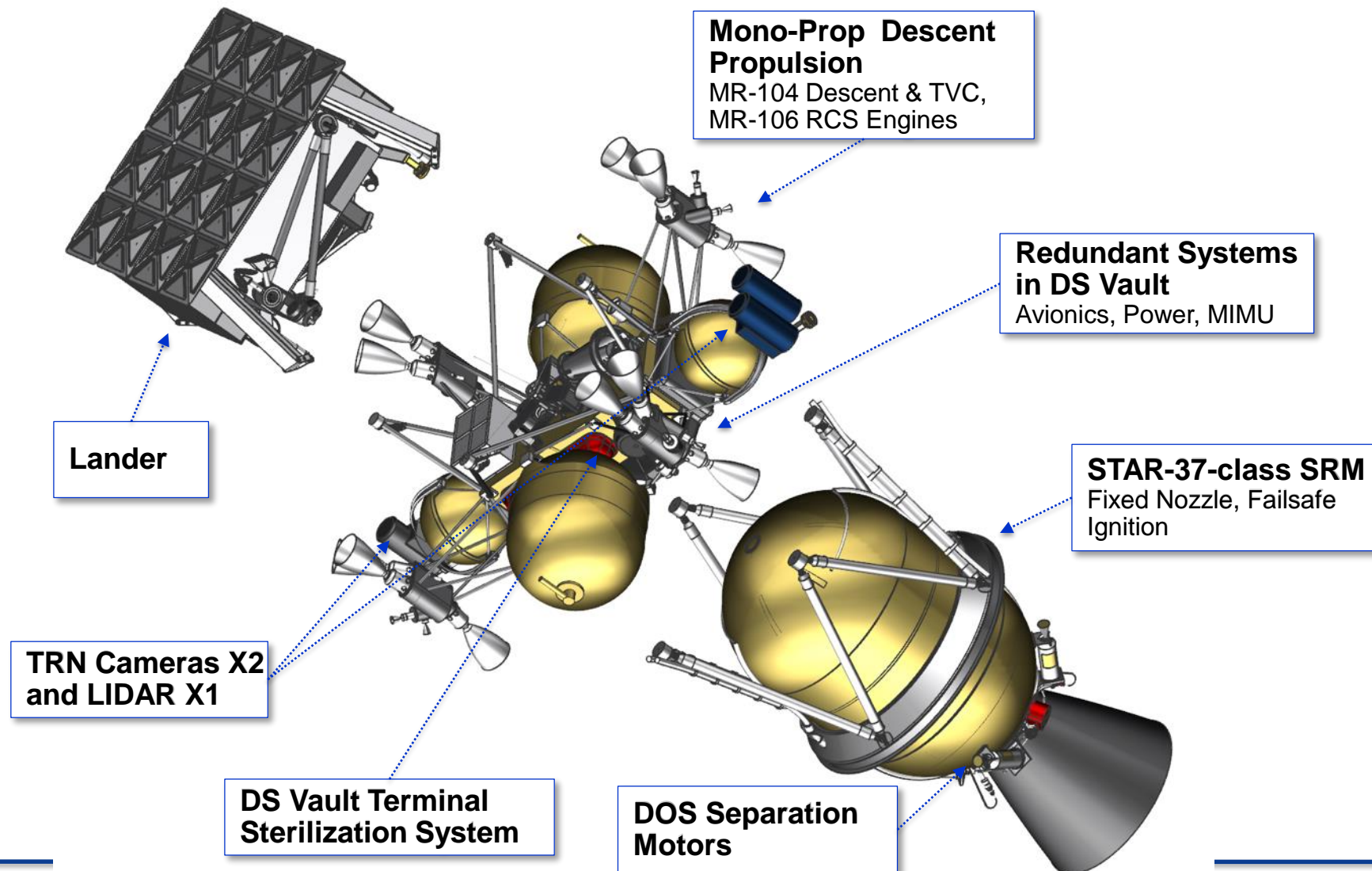


Carrier & Relay Stage Concept



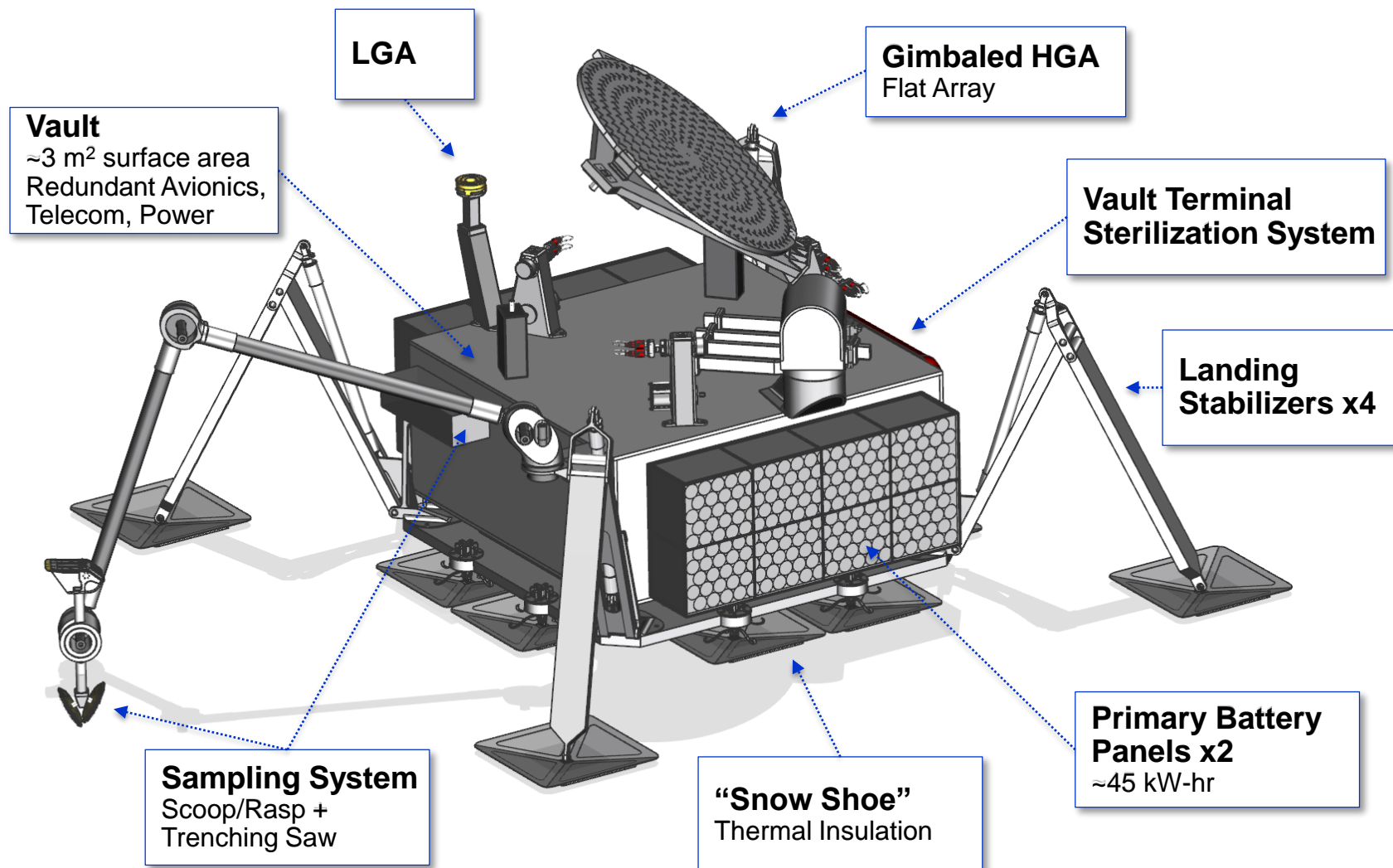


De-Orbit Vehicle Concept



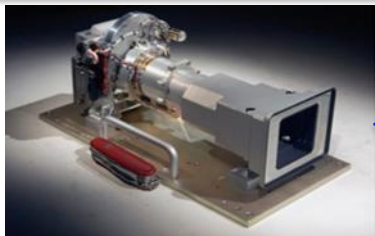


Lander Concept (Surface Configuration)

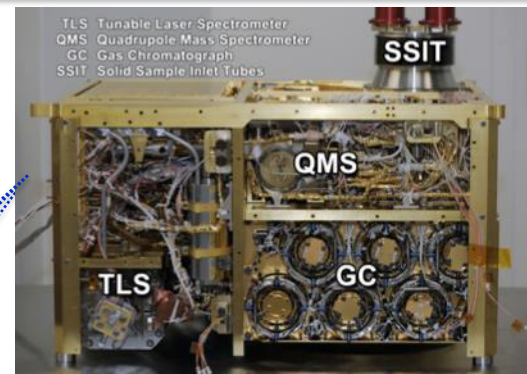




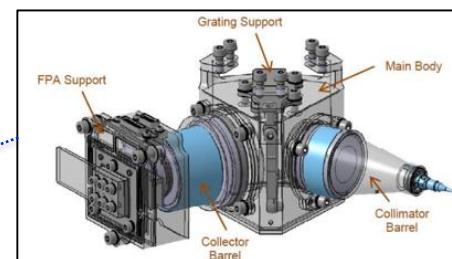
Science Definition Team (SDT) Example Payload Accommodation Concept



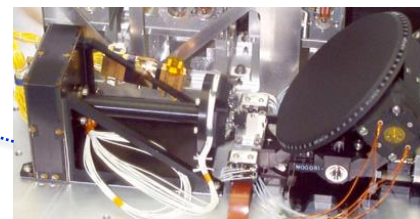
Context Remote Sensing Instrument (CRSI)



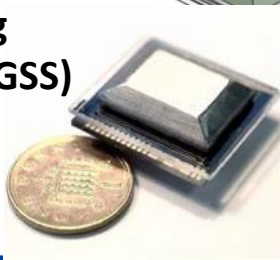
Organic Compositional Analyzer (OCA)



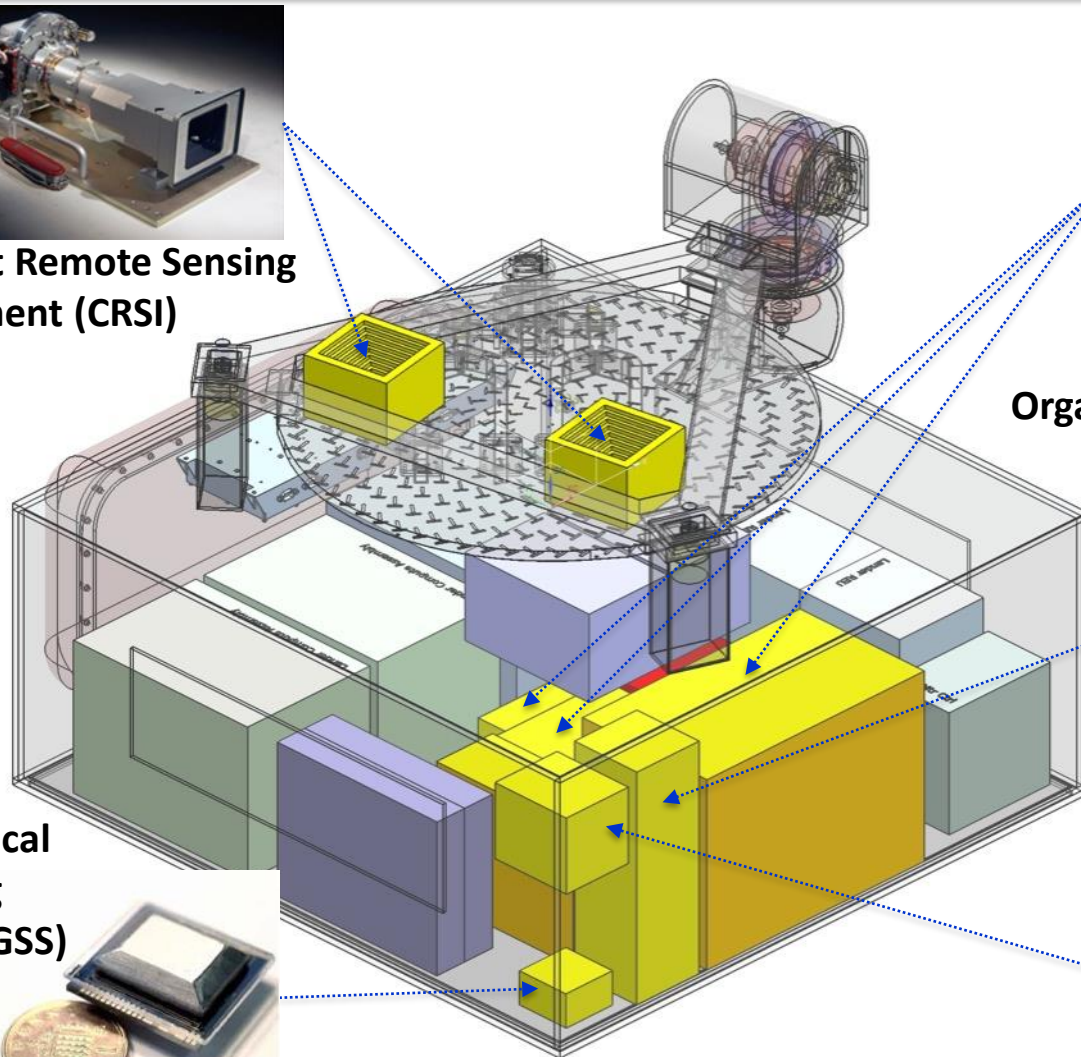
Vibrational Spectrometer (VS)



Microscope for Life Detection (MLD)



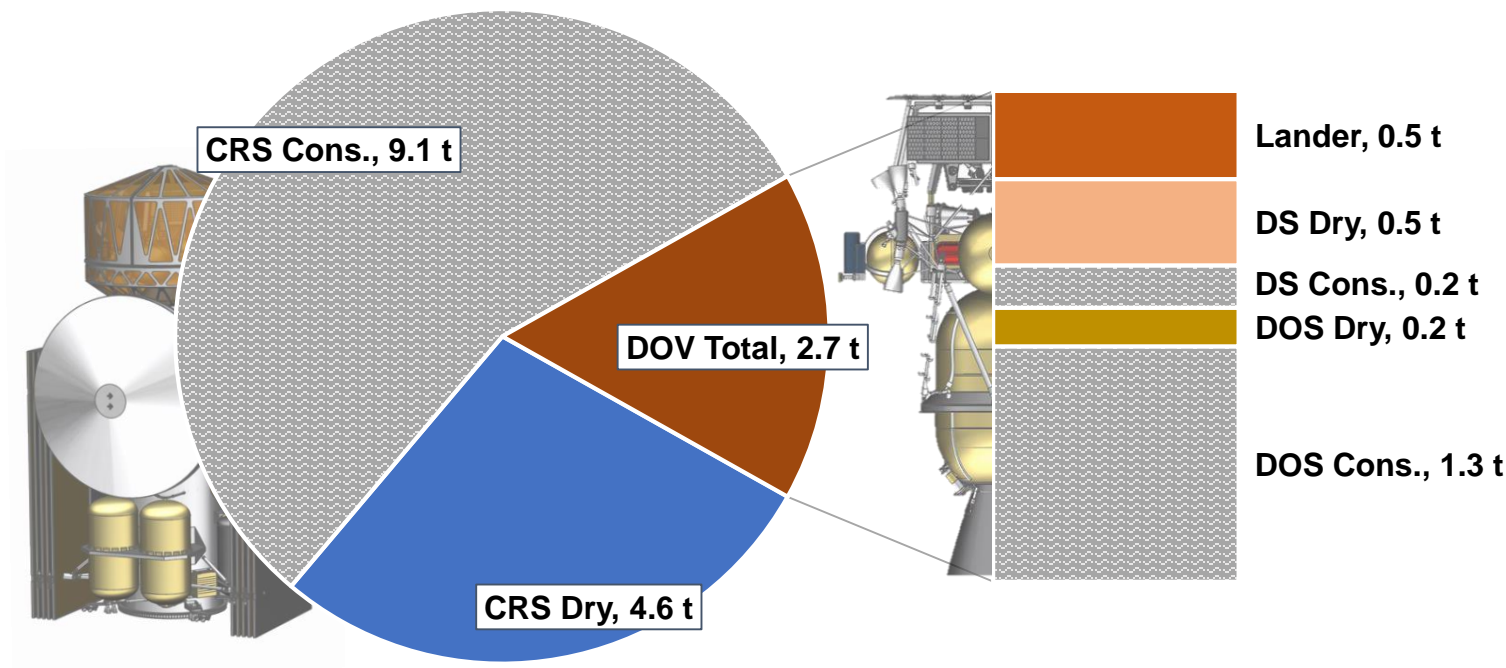
Geophysical Sounding System (GSS)





Mass Allocations (Approximate)

Total Launch Mass Currently Allocated: ~16.4 t (incl. margins)
SLS 1B ΔVEGA Launch Capability: ~19.8 t





Conclusion

- The current flight system concept represents a feasible solution to the challenges of conducting in-situ science at Europa
 - Addresses radiation, thermal environment, large ΔV , terrain uncertainty, relay telecommunications, planetary protection, etc.
 - Maintains a high degree of functional separation, while leveraging common engineering developments, including from Europa Clipper and Mars 2020



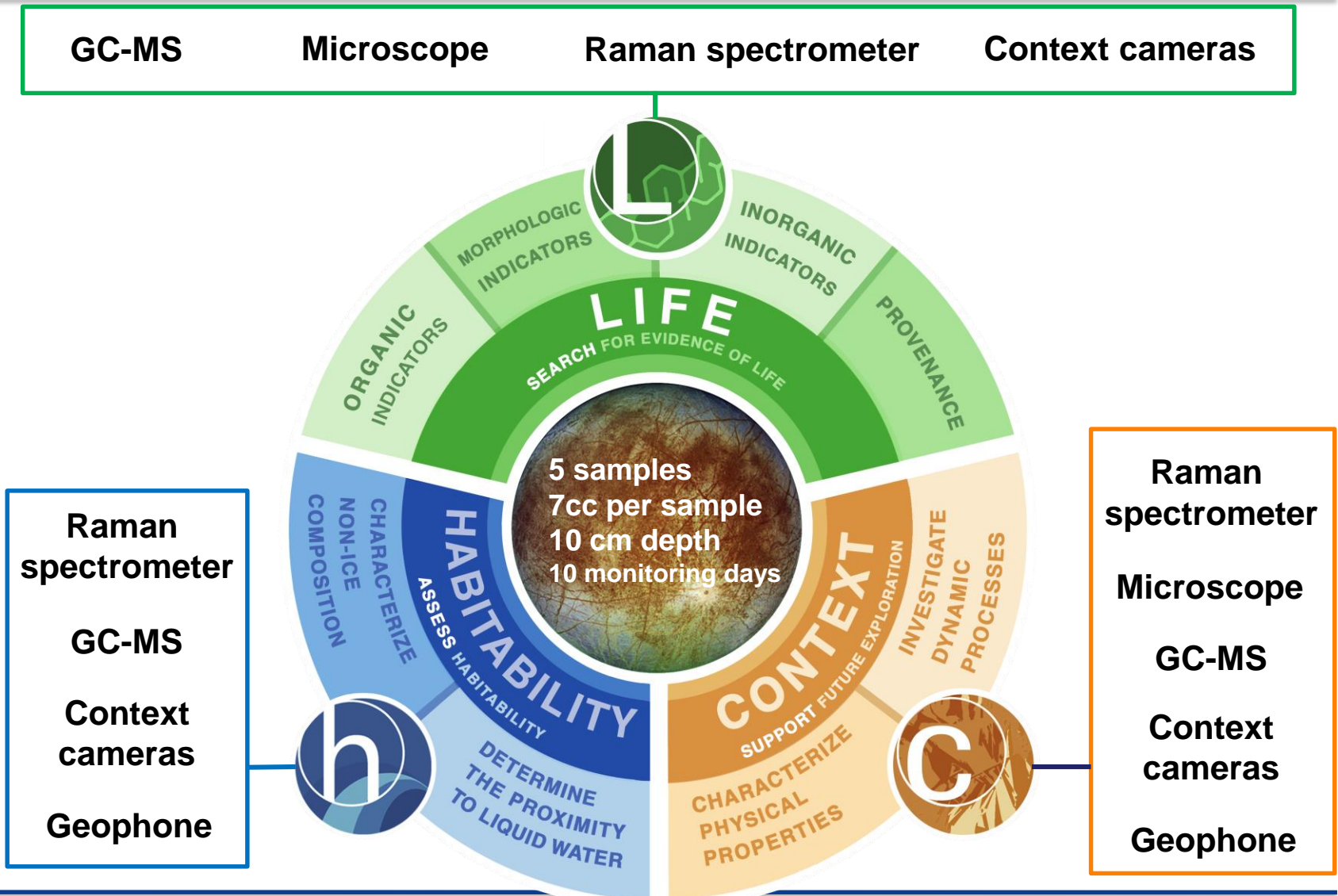


Backup



Science Definition Team Recommendations:

A Connected Set of Goals & Objectives
Addressed with a Focused Model Payload





De-Orbit, Descent and Landing (DDL) Concept Overview and Timeline

